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# Usability and Interaction Design in West Africa

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Good usability is important in all ICT solutions. To achieve good usability, a good praxis for interaction design is needed. Usability and interaction design have however emerged and established itself in a North European and US context. The ICT industry in Africa do not have the same resources in the field of interaction design as in the developed world. While good usability and good user experiences are important to all users of ICT, the question is whether the methods and techniques that were mainly developed in Scandinavia, Europe and US are suitable for ICT development in Africa? Can ideals for user-involvement and participatory design be directly transferred? How can interaction design and usability be cared for in African ICT development context, given the resources available? This paper aims to initiate a discussion of the conditions for interaction design and usability in West Africa, with a specific aim at the dissemination of knowledge in field of interaction design both in an academic context, as well as among practitioners. More specifically the paper discusses how interaction design knowledge can be disseminated in West Africa, particularly in Higher Education.

## Introduction

The purpose of this paper is to initiate a discussion about the suitability of the approach to ICT design called 'interaction design' in a West African context. The aim is not to give a complete overview to rather to initiate a discussion about the extent to which a concept like 'interaction design' is applicable in a West African ICT engineering context, and some considerations of the implications of introducing the concept in this context.

The paper is based on the author's experiences with teaching Interaction Design to international bachelor and master students at Aalborg University, Copenhagen, Denmark, and particularly at the joint Master's Program 'MICT' - Master in Information and Communication Technologies - in cooperation with Ghana Telecom University College from 2008 - 2012. Furthermore also my experiences of supervising Master's Thesis projects with

strong elements of interaction design, hereunder one at MICT, are included as background. The empirical foundation is limited, and the paper shall be seen just as a input to a more general discussion of the applicability of Interaction Design in West African context. A literature review on interaction design in Africa has furthermore been conducted. The empirical background as well as the overviews produces however only a very tentative and limited knowledge, and should thus be supplemented with more extensive studies in future research.

## **Background**

What is 'Interaction Design'? The topic deserves without no doubt a much longer introduction than can be given here. A large body of research literature has already been published within the field. It is both in scientific and industry context a well established term. As an example: One of the world's biggest scientific societies for computer science, ACM (Association for Computing Machinery), has a journal titled 'Interactions' and Special Interest Group in 'Human Computer Interaction'. The term 'interaction design' is however not the only one being used to cover the part of ICT that involves or has implications for the users and the usefulness of the ICT service or software. Other terms include 'Human Computer Interaction' (HCI), 'user studies', 'user centered design', 'usability', 'Man Machine Interaction' (MMI), 'Human Factors' and 'user experience' (UX). Since space is limited in this paper I shall in the following introduce to the field from the perspective of interaction design, and relate the term to the Human Computer Interaction tradition, particularly how it has been operationalized in the concept of 'usability'.

The term 'interaction design' consists of two elements. The word 'design' implies the professional consideration of different approaches and solutions to a problem or set of problems that are not very well defined. The term 'design' reaches thus beyond aesthetic problems. Design decisions are thus taken to accommodate a future situation and produce a desired outcome. This not can obviously not be achieved just through a description or observation of the world like pursued by the natural sciences. Engineer and Nobel Prize winner Herbert Simon pointed already in 1969 at the insufficiency of teaching natural sciences to engineer students. This produce just descriptions of the world, not new ideas and solutions. What was needed, Simon (1969) argued, was 'science of the artificial', a 'science of

design' that supported the 'creating the artificial' (understood as the man-made solution to a specific problem). Interaction Design could be understood as such a science, aimed particularly at the field of ICT.

Contemporary as well as later authors are however skeptical about Simon's mathematical and rational approach to problem solving which aimed at isolating the problem before solving it. Thereby important socio-economic and cultural knowledge is ignored, which eventually leads to dysfunctional designs and planning disasters. The activity of planning and designing can thus be seen as case of dealing with what Horst W. J. Rittel and Melvin M. Webber in their article "Dilemmas in a General Theory of Planning" (1973) termed 'wicked problems'. Contrary to well-defined 'tame problems' like mathematical or logical problems, 'wicked problems' are characterized e.g. by the absence of a stopping rule or a final solution, by the phenomenon that the solution often is a 'one shot operation' e.g. due to cost of implementation and realization, by the condition that the planner typically has no right to be mistaken in his or her assumptions, by that what appears to be the problem as well may be described as a symptom or consequence of another problem. A too naïve approach to the process of 'solving' or rather addressing problems that are genuine wicked might thus result in a dissatisfactory solution. Obviously, problems can be termed 'wicked' just as an excuse for the lack of thorough analysis prior to the problem solving. What however is essential in Rittel and Webber's concept is the notion of complexity in solving of real world problems and the notion of dynamic and emergent change e.g. of societies that makes structured planning in-operational or less productive (cf. Johnson, 2001).

The other word, 'interaction', is as broad as 'design'. Within the ICT the ambiguity of the word is maybe characterizing central problems that ICT developers are confronted with: Machines and their sub-systems must interact with each other in order for the system to work, but if the human users do not know how to interact with the systems, or if the systems do not interact in the way needed in the situation, the system has a very little value. The major challenge for the academic field called 'interaction design' is thus to design ICT systems in a way that they are useful and valuable in the situations they are used. This kind of problem can either be perceived as a straight-forward 'tame' problem that can be reduced to sub-problems through a thorough analysis, or it can be perceived as a 'wicked problem' that not only includes the complexity produced by the heterogeneity of the users and their

computer equipment, but also by the complexity of the purposes for which the ICT tools are used, including the values projected into the ICT systems and the application of ICT systems for the pursuit of higher goals.

Presented in an over-simplified way, the first approach could be described as the Human Computer Interaction research tradition (HCI), expressed in the concept of usability, popularized by the work of Jakob Nielsen (e.g. Nielsen, 1992; and the 'Alert boxes' at [www.useit.com](http://www.useit.com)). Particularly the ten heuristics - which could be described as a type of good advices - published by Jakob Nielsen and the co-author Rolf Molich (Nielsen & Molich, 1990; Nielsen, 1995) has contributed to the success of the concept of usability. The normative character of the advices as well as their claimed universality does however not really take the context into account. The interaction between the user as a system is perceived relatively straight forward as a series of requests and responses, a formalized dialogue. The approach to the problem-solving in ICT is descriptive and analytical.

The other approach could be described as 'interaction design' with its emphasis of user-participation and involvement (e.g.: Ehn & Kyng, 1991; Buur & Bagger, 1999), contextual enquiries (Beyer and Holtzblatt, 1998), and more recently user experiences (UX), (cf.: Hassenzahl & Tractinsky, 2006; Wright, Blythe & McCarthy, 2006). The approach could be described as open-ended and explorative, in some cases observational, in other cases experimental. One branch of researchers even argue that interaction design should be seen as a reflective and thoughtful process where the constraints and limitations is seen as a 'conversation with the design material' (Löwgren & Stolterman, 2004; Schön, 1983).

User involvement is often a central part of interaction design. Users can be mobilized both as sources of specific knowledge, e.g. regarding a workplace situation, as expansion of the designer's general understanding of the heterogeneity of values and cultures, as testing of design proposals and prototypes, and as a measurement to ensure end-users' acceptance of the proposed solution. Users might be involved in all phases of the design process. The objective of user-involvement can be embedded in very different purposes, ranging from a egalitarian basis-democracy approach to a role of being mere informants and testers.

If we look at the early interaction design activities emerging in the Scandinavian countries in the 1980's, they were rooted in very political context. What I here refer to is the so-called

“Scandinavian Participatory Design tradition” (Ehn, 1988; Ehn & Kyng, 1991; Gregory, 2003). This tradition is based on the ideal of an ‘industrial democracy’, understood as “the attempt to extend political democracy by also democratizing the workplace” (Ehn, 1988: 4). The 1970’s and 1980’s can be described as the apex of Scandinavian workers’ movement, and thus also with influential trade unions. Seeking the collaboration with trade unions and workers appeared thus not only to mirror the *zeitgeist*, but also be a wise way for designers to improve the design of the ICT solutions. Ehn (1988: 4) thus also mentions as purpose “to design skill-enhancing tools for skilled workers to produce highly useful quality products and services”. The danger of ICT implementation producing unemployment is thus countered with a promise of involvement and improved skills. The trade unions were thus often important and powerful partners when workplaces were equipped with computers and when computers systems were developed for a workplace context. The workers’ acceptance of the ICT solution was crucial to the stability of the labour market. Ehn and his colleagues discovered however also that workers are important sources of knowledge when it comes to development of ICT services; they have a specific, contextually bound, knowledge that is important when the functionalities and interface the system should be developed. It is thus the mutual understanding between system developers and end-users that stand in the middle in the participatory approach to ICT design.

As an important finding from the early participatory work is the observation of the communication, and the difficulties of communication, between the different parties involved in the ICT design process. Ehn (1988) observes that experiences, knowledge and understanding of the possibilities and constraints in development of the ICT systems are different among the involved parties in the process. They are thus confronted with the challenge of constructing a shared language that can be used understand each other’s knowledge, ideas and experiences. Ehn (1988) even analyzes this in a philosophical perspective when he applies Ludwig Wittgenstein’s concept of ‘language game’ (Wittgenstein, 1953) to the problem of ICT design: meanings of words are not fixed and permanent, but changing and negotiated according to the context. One can argue that the language game problem also extends to the situation where e.g. an ICT artifact or interaction design process is applied in another cultural context than the one in which it was

created. The lessons learned from participatory design might thus be relevant when the topic interaction design in West Africa is discussed.

As Gregory (2003) however notices, the original concept of participatory design did not really survive outside the specific context of the research projects in which it was and is applied. To some extent, one can however claim that it is continued in the co-design, co-innovation and co-creation approaches (Sørensen & Henten, 2014), as well as in other types of user-involvement, e.g. user-centered design (e.g.: Bødker & Buur, 2002). We could thus describe the difference between usability and participatory design as the former being relatively normative and the latter more explorative and descriptive.

## **The African Context**

All these above mentioned techniques, methods and approaches for interaction design have been developed in North European or North American context. Now the question emerges: How are these techniques, methods and approaches used in an African context? Do they work differently in this context, are they applied in a different way, are they modified to suit the context? Obviously, answering this question requires much more empirical research, but a few sources are available.

In a paper titled “Assumptions Considered Harmful - the need to redefine usability” (2007) Heike Winschiers and Jens Fendler, both Dept. of Software Engineering, Polytechnic of Namibia, discuss the implicit cultural values and assumptions in usability engineering and -evaluation. Based on a thorough literature review and a smaller experiment with Namibian government officials, they conclude that a understanding of usability as universal and value-free is problematic. They identify the roots of usability engineering “in the modernist or enlightenment tradition which values rationalism, individualism, information, performance and efficiency” but their experiment shows that when the Namibian users were asked to brainstorm over the concepts “usability” and “good working environment”, none of the classic terms related to “usability”, such as “speed”, “learnability”, “memorability” or “error rates” were mentioned. Instead terms like “easy, safe, comfortable, specific, reliable, right pace, goal-oriented, and conducive” (ibid.: 457) were mentioned. Based on this as well as on the authors’ own usability work in Namibia, they conclude that not only may classic

usability evaluation methods not produce true results, e.g. since questionnaires typically are filled with what the respondent thinks is the expected answer instead of the actual answer motivated by “a cultural listener-satisfaction and conflict avoidance habit” (ibid.: 454), but also that the values being looked for in the usability tests are less relevant in a Namibian context. They authors present a framework for culture-centric design where the “definition of quality criteria (Usability) and Cultural Models” is the foundation for both the project management, e.g. the selection and adaptation of methods and the usability evaluation in the development process (ibid.: 458).

Bidwell & Winschiers-Theophilus (2010) describe and discuss the conditions for interaction design praxis in Africa, in an article named “Beyond the Benjamins: Toward an African Interaction Design”. The paper, published in the prestigious journal “interactions” published by ACM, view the field from an academic perspective; both authors are engaged in research and teaching activities in South Africa, respectively Namibia. Their description of African Interaction Design has three elements: 1) The conditions for teaching and disseminating knowledge on interaction design, 2) the special African context for implementing ICT solutions, 3) a larger critical discussion of the dominant influences from Europe and particularly USA on the ICT development. I shall briefly summarize their arguments in the following.

First the authors notice that the incentive for ICT bachelor students to continue on the master level are few. For ICT bachelor students, a career in the industry is more attractive, since the costs for the bachelor education more easily can be covered, e.g. with an industry certification. Apparently, explicit industry needs define the bachelor curriculum in Namibia, leaving little space for interaction design: “higher education effort is often concentrated on a subset of core IT skills. This subset is influenced by employer perceptions of core competencies, which are tuned by power relations with the more developed world” (ibid.: 32). It is however not possible to read from the paper if or to which extent interaction design or related elements are taught on bachelor level at the School of Information Technology at the Polytechnic of Namibia, where one of the authors serves as dean. The question also emerges what teaching ‘interaction design’ knowledge at a bachelors level means: is it scientific methods as we know from HCI and usability)? Or is it the thoughtful reflections inspired by Design Studies (Löwgren & Stolterman, 2004)? Or is it the craftsmanship of



learning to design user interfaces, information architecture, UML-diagrams, and business workflows that are useful in a specific context, downplaying the reflections and the general knowledge? While the two former requires many academic skills from students and thus may only be suitable on a master's level, the latter is to a high degree tacit knowledge (Polanyi, 1983), meaning hands-on knowledge that effectively only can be acquired in practical design work, not from a textbook (cf.: Schön, 1983).

The second element in Bidwell & Winschiers-Theophilus (2010) revolves around a description of the African context for ICT design and implementation as different from the European or US context. The authors mobilize the concept "localization", introduced by Lucy Suchman (2002) to make a claim for "design by Africans in Africa for African situations" (Bidwell & Winschiers-Theophilus, 2010: 32). Suchman's concept describes ICT design work as a process not disconnected from the context in which the ICT systems are going to be used, but as "our participation in the various mediations that define the production and use of new technologies, and taking some responsibilities for them" (Suchman, 2002: 94).

As an example of what we could call 'an African situation', the authors present a short case story about the hassle involved in buying a bus ticket when cash-payment is not allowed and the credit card ICT infrastructure is off-line. With this example, the authors point at the particularities of the physical, technical and organizational environment in which the ICT solutions are implemented in an African context: Power failure, lack of internet connectivity, traffic congestions, lack of competences and knowledge, lack of delegation of work, etc. The authors notice that this type of cases not are described in the HCI textbooks. Since students are reported to pay very much attention to the wisdom from textbooks, there is a risk that later in their professional life they "will support inappropriate methods in requirements gathering and usability tests" (Bidwell & Winschiers-Theophilus, 2010: 34). The authors calls for a critical culture among students, that is a prerequisite for questioning the validity of textbook knowledge. The authors however also notice that is culture of critical thinking first must be introduced before "the relevancy of system design and development practices that originate in norms produced elsewhere" (ibid.: 35) can be criticized. The textbook centered approach to teaching interaction design thus calls for new textbooks, but another approach to the question could be to question the use of textbooks at all, and instead

develop interaction methods that are grounded in African situations, in the same manner as the methods and techniques today world wide known as interaction design emanates from a Scandinavian and US context. The question is however: to which extent are 'African situations' fundamentally different from other situations in which ICT is used, or to which extent can they just be perceived as more extreme cases?

The authors make the claim that the ICT solutions should be made by Africans, a claim which makes sense when the tacit knowing of the designer is valued. The paper however indicates that (young) African ICT engineers are likely to follow suggestions made by US or European ICT providers, instead of developing solutions that takes African situations into considerations. A more fundamental analysis of the interplay between hardware and software that is designed outside Africa and the 'African situation' is however necessary to understand on a more detailed level the interaction design decisions being taken: Are US and European ICT technology really embedded with non-African values thereby calling for an African way of doing ICT, or must the process of applying and implementing ICT solutions just be conceived differently? Another open question is whether the same tensions between the limitations of the ICT hardware and software, and the use contexts, not also are present in a European or US context, albeit on a higher level?

The third element in Bidwell & Winschiers-Theophilus (2010) is based on the assumption that IT systems, which are developed by American or European companies "are embedded with values and practices that differ from those of African people" (ibid.: 32-33). The HCI textbooks are also "invested with non-African values" (ibid.: 33). Unfortunately these statements are not discussed further or augmented with examples and definitions, e.g. of 'non-African values'. It thus up to the reader to interpret the statement. One interpretation could be that the problems of differences in values is rather a problem related to applications, service design, user interface design and interaction design, than to programming languages, hardware and technical platforms. This understanding assumes that the computing and information processing itself is detached from social and cultural values, and that these rather are expressed or encountered in the use of the ICT services. On the other hand, one can argue that e.g. also hardware have embedded socio-technical values, or, if you like, the broader socio-technical implications of the dissemination of ICT, including societal change. This leads to a larger debate on the desired future society and to a discussion

of ICT seen either as a neutral tool applied on societal or organizational problems, or as discourse embedded with values. Unfortunately the authors are not very specific in this matter.

## **Discussion**

Several issues emerge from literature review presented above. Possibly the biggest of these discussions revolve around the question whether the 'African situation' for respectively ICT development and ICT use is fundamentally different from other 'situations' or 'cultural context', in a sense that requires an entirely different approach, or it is 'just' framed by certain conditions that are exposed whenever methods, techniques, approaches and solutions developed e.g. in a European or US context are applied? While the first view calls for a definition of the particular 'African', but also make possible an examination of the implicit values embedded in the general concept of ICT - or rather its application, the latter view may - a bit naïve maybe - just see 'the African situation' as one under development with the Western world as blueprint. Now both of these views appears equally inaccurate since they assume either a static or linear development, thus ignoring the dynamic forces both in ICT praxis and in societal development. I will thus argue that it is problematic to subscribe entirely to the one or the other position. In the following, I will suggest a third possibility.

A central finding from the participatory design research in Scandinavia in the 1980's and 1990's was the importance of the 'language game' going on in ICT design process. The participants in the design process are confronted with the lack of a shared understanding of the use situation. This lack may be caused by the lack of formal, abstract knowledge (textbook knowledge), or the lack of practical experiences with field. It may be caused a lack of will or interest in engaging with the problem and its complexity, or it may even be a strategy to minimize the development costs. The important thing here is to remember that an ICT system is not always a commodity or product that can be traded on the market; often it is in its configuration to a specific context that it gains its value. Although ICT services to some degrees have similarities with industrially produced goods, e.g. since it is build from generic elements and since the service can be delivered in the absence of the producer, it is has also some strong elements of being a service since it is immaterial, information-based

and essentially a process of communication between a user / customer and some resource, cf.: (Sørensen & Henten, 2014). The service elements in a ICT solution point thus at the communication taking place between the user and the system (or another user connected via the system), which again stresses the need to acknowledge the language game going on. This language game is however strongly determined by the properties of the ICT systems, e.g. its interface, information architecture and structure. Users must accommodate themselves to ICT systems, since ICT systems - as clear rule-based structures - not are capable of accommodating themselves to users, at least not in a very convincing way, cf.: (Harris & Henderson, 1999). Users' have to 'learn' to use the ICT systems, and this learning process typically means abandoning existing concepts of the world and the implicit values in these concepts. The tensions between the existing knowledge and the discourse embedded in the ICT system become thus clear whenever a user has to acquire "IT skills"; there are no or few possibilities for negotiating the language game with the ICT system.

One can argue that the blind spot for usability - but also to some degree for interaction design - is the denial of this tension. Typically, "ease of use" is being strived for, and if sufficient means are available the interaction designers may search for the optimal solution, meaning the design with the lowest learning demand on the users. The 'African situation' however enriches this straight-forward view with some complications: Suddenly it is not 'efficiency' that is demanded by the users, but 'the right pace' (Winschiers and Fendler, 2007: 457). This can of course be depicted as consequence of different cultures or different degrees of development, but instead of this rather normative reading, the differences in values can be seen as an indicator of the lack of acknowledging the dynamic language game going on. The cases presented above thus serve to highlight a general tension in ICT design, a tension which not - I will argue - cannot be removed even with endless resources for interaction design and usability, but instead it points to necessary acknowledgement of the agenda-setting and educating elements in ICT systems: They shape social behavior. The design of ICT is thus not value-free, but a more explicit articulation of the implicit values may help developing a meta language game for interaction design.

The literature review above, as well as my own experiences with teaching interaction design in a Ghanaian context, leads also to some more practical questions concerning how, where and when to teach usability and interaction design in an African context. Is a prerequisite for

teaching interaction design that students have a high level of academic skills - which would make teaching at the bachelors' level difficult? What is and what should be the role of text books in teaching interaction design and usability? To which degree and how should classic methods and techniques be taught loyal to their origins, or to which degree should they be modified to the context? To which degree should interaction design and usability be taught as idealistic, normative form of knowledge, or to which degree are they praxis fields open for contextual interpretation?

Implicit from the paper by Bidwell & Winschiers-Theophilus (2010) it appears that interaction design is not taught in Polytechnic of Namibia at the bachelor's level. From the paper it also appears as if the reason for this is that a certain level of academic skills, e.g. scientific methods, are seen as a prerequisite for students learning interaction design. I will here argue that the question of student prerequisites points back to how interaction design (as well as usability) is conceptualized. There are a number of ways to understand the field: It can be understood as an explorative praxis, a set of practical skills, that has to be learned by doing. The reflection that contributes to the learning process is then the 'reflection in action', in the moment of work, and the 'reflection on action' that takes place in between or after the actual work. The two terms here presented are borrowed from Donald A. Schön and his studies of learning- and work processes among practitioners such as architects (Schön, 1983). The textbook knowledge plays a little or possibly no role in this understanding of interaction design, since it ideally is 'a conversation with the material' (cf.: Löwgren & Stolterman, 2004). The academic reflection emerges empirically in a participatory process, negotiated with peers, users, and the literature.

Interaction design, and particularly usability, can also be understood as normative praxis where interfaces, information architectures and systems are designed from a blueprint or a best practice. In this craftsmanship approach reflection has little space; it is a matter of fitting things together and produce solutions. The textbook provides the blueprint for the solutions. Finally, Interaction design and usability can be seen as academic - analytical activities where the goal is very precise descriptions of the problem observed, and / or an analysis of the set of preconditions or constructions determining the problem. Here "the textbook", understood as the full body of research, plays the role as the canonical collection of proven methods and techniques that makes it possible to construct classic scientific arguments and

claims around observed facts. I would thus argue that it is scientific ideal behind interaction design and usability that determines when to introduce these fields to students. What we could call the inductive approach to teaching interaction design would start with students' very simple observations of usability- and interaction design problems in every day life. This does not require much more than a sensitivity to observation and a teaching culture that support encounters with students that are driven by their curiosity and reflection, not a predefined result. The gradual generalization of knowledge and the application established methods and techniques is introduced as a pattern in students' observations emerge. Finally, these methods and their results can be evaluated against their ability to produce different kinds of scientific knowledge. In this way, a strong link between students' experiences with actual ICT design and the proven methods in the field is made. The other approach - we could call it the 'deductive approach' - would ask students to apply the well-established methods on problems in order to prove the theory and produce analytical results.

## **Conclusion**

I believe that Interaction design and usability teaching should contain both explorative, experimental and analytical, reflective elements. A pure inductive approach to interaction design will lead to the lack of strong analyzes that can position and relate the field of user studies to the other elements in ICT design and development. The risk would then be a field of knowledge that only can point at itself as resource. A pure deductive approach leads to the risk of ignoring the actual embodiment of interaction as it is expressed in users' daily use of ICT devices and services, their problems of 'learning' how to use the ICT and their eventual resistance, frustration or tensions when confronted with ICT service. Winschiers and Fendler (2007) provides with their article an illustrative case of how a very deductive and apparently textbook loyal way of understanding usability is exposed when confronted with Namibian reality. Many other studies could be mentioned that show the same mismatch between the deductive normative approach in usability thinking and the actual reality, but the 'African situation' emphasizes the problem.

This paper argues, like Winschiers and Fendler (2007) that established interaction design and usability methods and techniques should be used with care whenever the designers and system developers or consultants aim for producing a solution that actually fits the context.

Assuming that results can be achieved in a vacuum freed from established methods and techniques is problematic, even if these methods and techniques originally were conceived in another (cultural) context. But by paying attention to the early findings from participatory design, which emerged in a similar situation where decision in ICT design decision where taken so far from the actual context that they became in-operational and the solutions dissatisfactory, the problem of adapting - or not - established methods can be countered. The key here is concept of egalitarian participation and the acknowledgement of the language game. This approach may seem less efficient on the surface, but it is very efficient when valuable information about users and use context should be collected by interaction designers, and when the concepts and thinking behind interaction design and usability should taught to students not familiar with the concept.

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